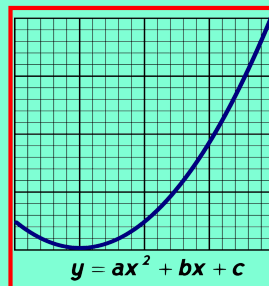


Math 125
Fall 2021
Lecture 24



class QZ 19:

Solve by graphing:

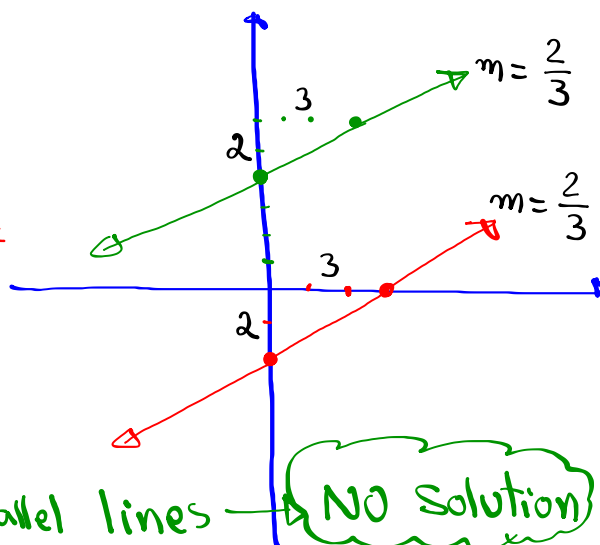
$$\begin{cases} 2x - 3y = 6 \\ y = \frac{2}{3}x + 4 \end{cases}$$

$$y = \frac{2}{3}x + 4$$

Y-Int (0, 4)

$$m = \frac{2}{3}$$

$$\begin{array}{r|l} x & y \\ 0 & -2 \\ 3 & 0 \end{array}$$



System of linear equations in 3 Variables

$$\begin{cases} x + 2y - 3z = 9 \\ 2x - y + 2z = -8 \\ -x + 3y - 4z = 15 \end{cases}$$

Answer
ordered-triple
(x, y, z)

Solution has to work with all 3 equations.

Is $(-1, 2, -2)$ a Solution?

$$x + 2y - 3z = 9 \checkmark$$

$$-1 + 2(2) - 3(-2) = 9$$

$$-1 + 4 + 6 = 9$$

$$3 + 6 = 9$$

$$9 = 9 \checkmark$$

$$2x - y + 2z = -8 \checkmark$$

$$2(-1) - 2 + 2(-2) = -8$$

$$-2 - 2 - 4 = -8$$

$$-8 = -8 \checkmark$$

$$-x + 3y - 4z = 15 \checkmark$$

$$-(-1) + 3(2) - 4(-2) = 15$$

$$1 + 6 + 8 = 15$$

$$15 = 15 \checkmark$$

$(-1, 2, -2)$ works
with all 3 equations.
It is a Solution.

Is $(-1, -4, 5)$ a Solution of

$$\begin{cases} x - 2y + 3z = 22 \\ 2x - 3y - z = 5 \\ 3x + y - 5z = -32 \end{cases} \quad ?$$

Eqn ②:

$$2x - 3y - z = 5 \checkmark$$

$$2(-1) - 3(-4) - 5 = 5$$

$$-2 + 12 - 5 = 5$$

$$5 = 5 \checkmark$$

Eqn ①: $x - 2y + 3z = 22 \checkmark$

$$-1 - 2(-4) + 3(5) = 22$$

$$-1 + 8 + 15 = 22$$

$$22 = 22 \checkmark$$

Eqn ③:

$$3x + y - 5z = -32 \checkmark$$

$$3(-1) + (-4) - 5(5) = -32$$

$$-3 - 4 - 25 = -32$$

$$-32 = -32 \checkmark$$

Yes, $(-1, -4, 5)$ is a Solution.

Solve

$$\begin{cases} 3x - 2y + 4z = 14 \\ 3y - 2z = -4 \\ z = 2 \end{cases}$$

we already know

$$\boxed{z=2}$$

Plug it in in eqn (2)

Make back-Subs in eqn (1): $3y - 2(2) = -4$

$$3y - 4 = -4$$

$$3y = 0 \quad \boxed{y=0}$$

$$3x - 2y + 4z = 14$$

$$3x - 2(0) + 4(2) = 14$$

$$3x - 0 + 8 = 14$$

$$3x = 6 \quad \boxed{x=2}$$

Final Ans

$$\boxed{(x, y, z) = (2, 0, 2)}$$

Solve

$$\begin{cases} x + 4y - z = 20 \\ 3x + 2y + z = 8 \\ x - y + z = -6 \end{cases}$$

Take eqn (1) & eqn (2) and eliminate one of the variables.

$$\begin{cases} x + 4y - z = 20 \\ 3x + 2y + z = 8 \end{cases}$$

$$4x + 6y = 28$$

Divide by 2

$$2x + 3y = 14$$

Now take eqn (3) with one of the first 2 equations and eliminate the same variable.

$$\begin{cases} x + 4y - z = 20 \\ x - y + z = -6 \end{cases}$$

$$2x + 3y = 14$$

$$\begin{cases} 2x + 3y = 14 \\ 2x + 3y = 14 \end{cases}$$

$$0 = 0$$

True

infinite # of Solutions

Solve

$$\begin{cases} 2x - 3y + 2z = -1 \\ x + 2y + z = 17 \\ 2y - z = 7 \end{cases}$$

Take eqns ① & ②, then eliminate x .

$$\begin{cases} 2x - 3y + 2z = -1 \\ -2(x + 2y + z) = -34 \end{cases}$$
$$\begin{cases} 2x - 3y + 2z = -1 \\ -2x - 4y - 2z = -34 \end{cases}$$
$$\begin{aligned} 2(5) - z &= 7 \\ 10 - z &= 7 \\ z &= 3 \end{aligned}$$
$$\begin{aligned} x + 2y + z &= 17 \\ x + 2(5) + 3 &= 17 \\ x + 13 &= 17 \\ x &= 4 \end{aligned}$$

Final Ans:

$$(x, y, z) = (4, 5, 3)$$

Solve

$$\begin{cases} 2x + 5y + z = 12 \\ x - 2y + 4z = -10 \\ -3x + 6y - 12z = 20 \end{cases}$$

$$\begin{cases} 2x + 5y + z = 12 \\ -2 \{ x - 2y + 4z = -10 \end{cases}$$

$$\begin{cases} 2x + 5y + z = 12 \\ -2x + 4y - 8z = 20 \end{cases}$$

$$9y - 7z = 32$$

$$3 \begin{cases} x - 2y + 4z = -10 \\ -3x + 6y - 12z = 20 \end{cases}$$

$$\begin{cases} 3x - 6y + 12z = -30 \\ -3x + 6y - 12z = 20 \end{cases}$$

$$0 = -10$$

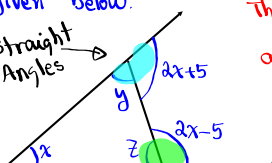
False
No Solution



Find all three angles of the triangle

Given below:

Straight Angles



The sum of All Three angles in any triangle is 180° .

$$x + y + z = 180$$

$$y + 2x + 5 = 180$$

$$z + 2x - 5 = 180$$

$$\begin{cases} x + y + z = 180 \\ 2x + y = 175 \\ 2x + z = 185 \end{cases}$$

$$\begin{cases} x + y + z = 180 \\ 2x + y = 175 \end{cases} \Rightarrow \begin{cases} -x - y - z = -180 \\ 2x + y = 175 \end{cases}$$

$$\begin{cases} 2x + z = 185 \\ x - z = -5 \end{cases}$$

$$3x = 180$$

$$x = 60$$

$$60 - z = -5$$

$$z = 65$$

$$2x + y = 175$$

$$2(60) + y = 175$$

$$120 + y = 175$$

$$y = 55$$

55°, 60°, and 65°

Hint: Use Addition Method

$$\begin{cases} 3x + 4y = 2 \\ 2x + 5y = -1 \end{cases}$$

$$\Rightarrow \begin{cases} -6x - 8y = -4 \\ 6x + 15y = -3 \end{cases}$$

$$\underline{7y = -7} \quad \boxed{y = -1}$$

$$2x - 5 = -1$$

$$2x = 4 \quad [x = 2]$$

Final Ans $(2, -1)$